RÉPUBLIQUE FRANÇAISE
Liberté Égalité Fraternité

FRANCE 2030 — PROGRAMME DE RECHERCHE — CARBONE ET ÉCOSYSTÈMES CONTINENTAUX

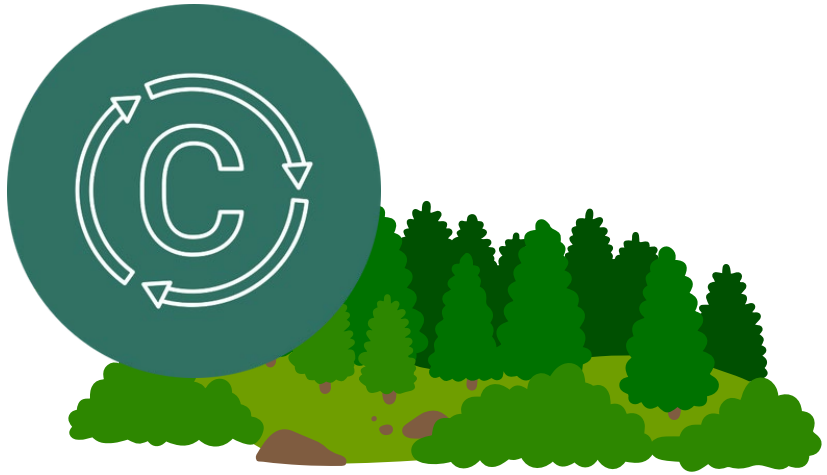
Drought ForC

Drought effects on carbon assimilation and allocation in living tree biomass in forests

Jeanne Poughon
PhD supervisors:
Jean-Marc Limousin (CEFE)
Maxime Cailleret (RECOVER)

cnrs INRAE

Context



Forests play a major role in the global carbon cycle

Two ways to estimate forest carbon fluxes

Harris et al. 2021
Cabon et al. 2022

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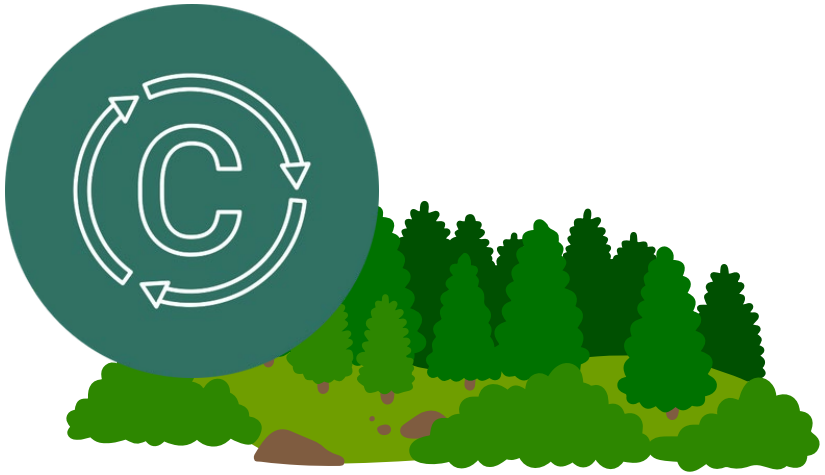

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Forest inventories

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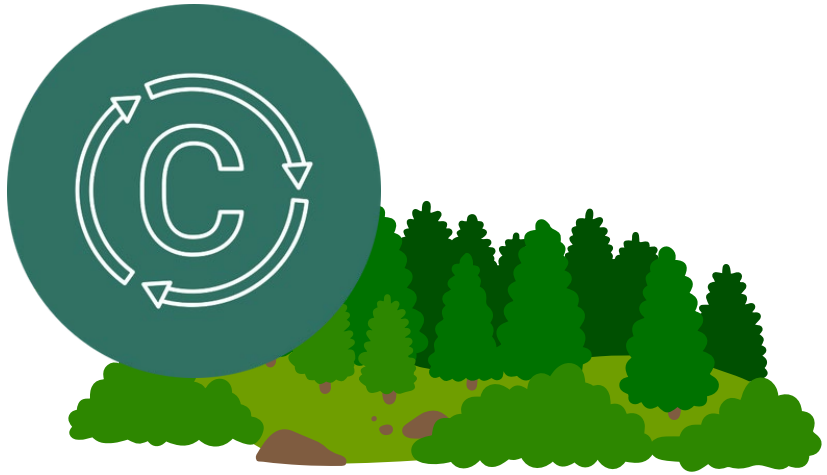

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- Forest inventories
- Eddy covariance fluxes

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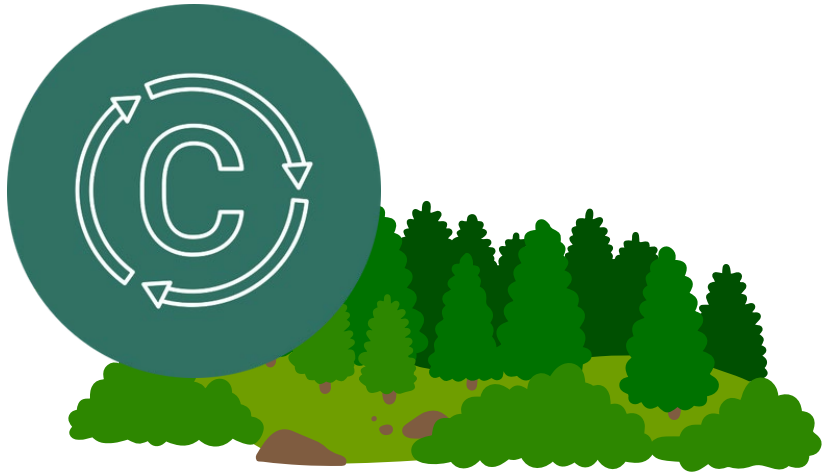

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Two ways to estimate forest carbon fluxes

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disagree

Decoupling is stronger with drought

Harris et al. 2021
Cabon et al. 2022

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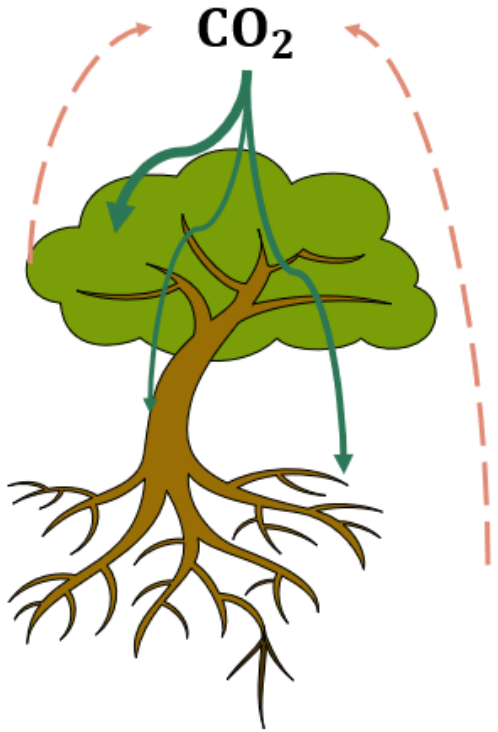
Where does forest carbon go and how is it impacted by drought?



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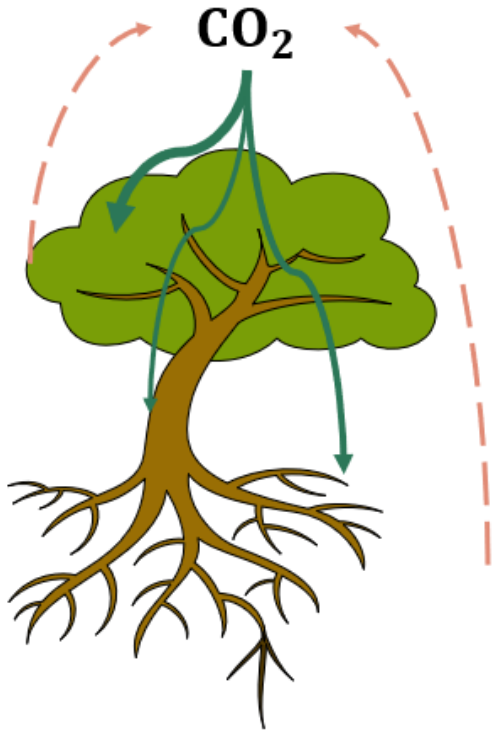

Research axes

- Improve our understanding of the link between photosynthetic C uptake and wood stem growth

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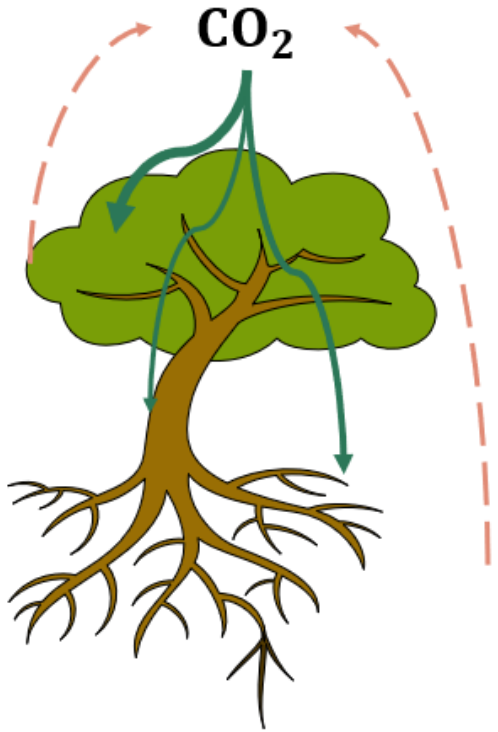

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- Improve our understanding of the link between photosynthetic C uptake and wood stem growth
- Investigate the effects of drought on tree architecture, C allocation among the different aerial tree organs and C residence time in the ecosystem

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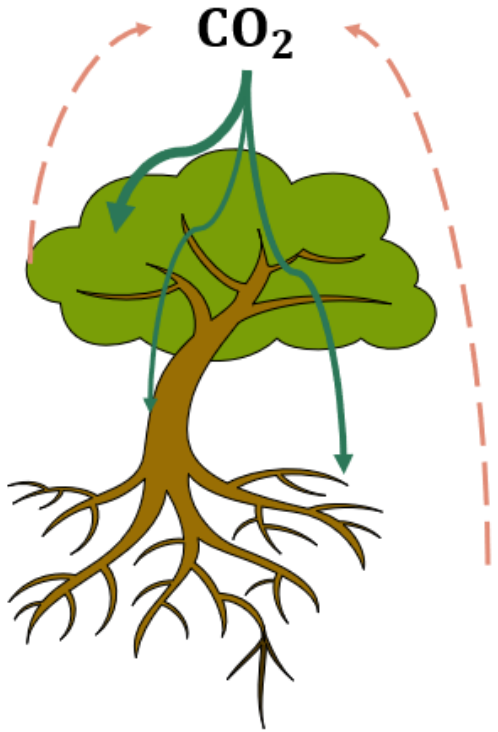

Research axes

- Improve our understanding of the link between photosynthetic C uptake and wood stem growth
- Investigate the effects of drought on tree architecture, C allocation among the different aerial tree organs and C residence time in the ecosystem
- Quantify belowground C allocation and its response to drought

Data from experimental forests

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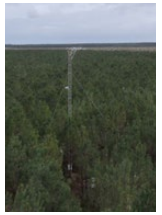
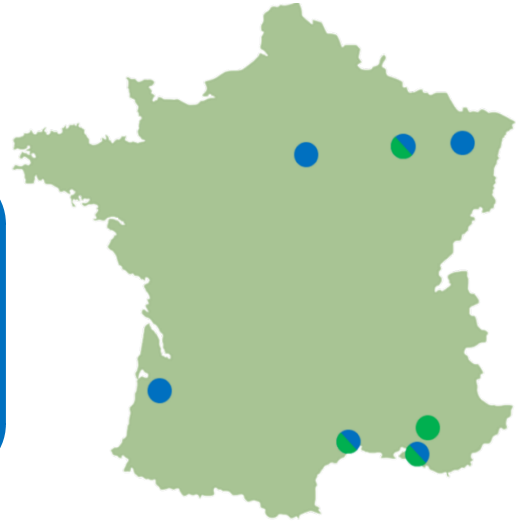
ICOS Integrated Carbon Observation System

Eddy covariance

Puéchabon	Font-Blanche	Barbeau	Bilos	Hesse
				



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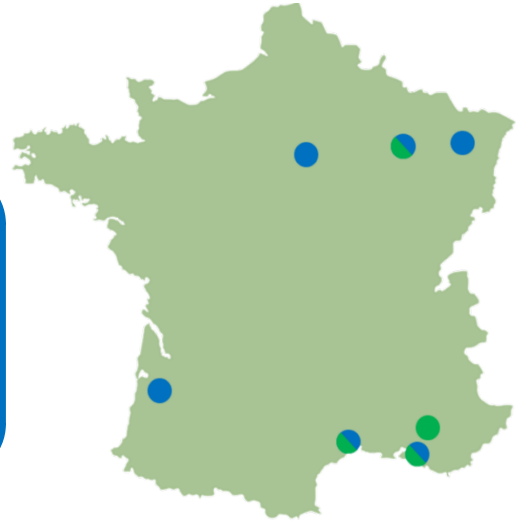

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			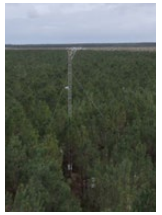	

AnaEE Analysis and Experimentation on Ecosystems

Rainfall exclusion

Puéchabon	Font-Blanche	O3HP	Montiers
			

Data from experimental forests

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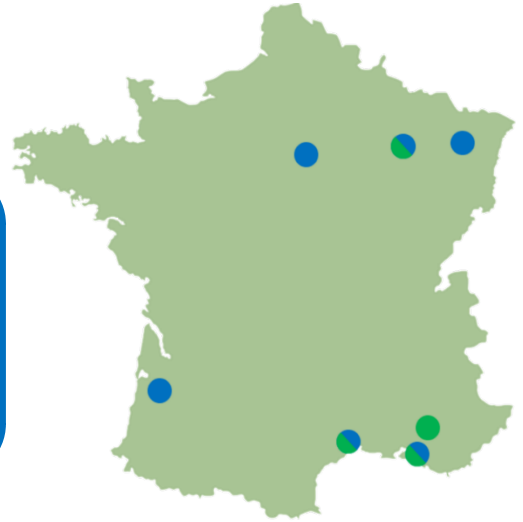
Fagus sylvatica
Pinus halepensis
Pinus pinaster
Quercus ilex
Quercus petraea
Quercus pubescens



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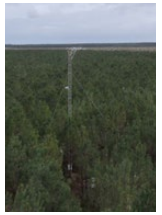
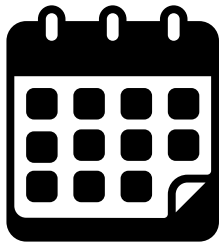



Long time series



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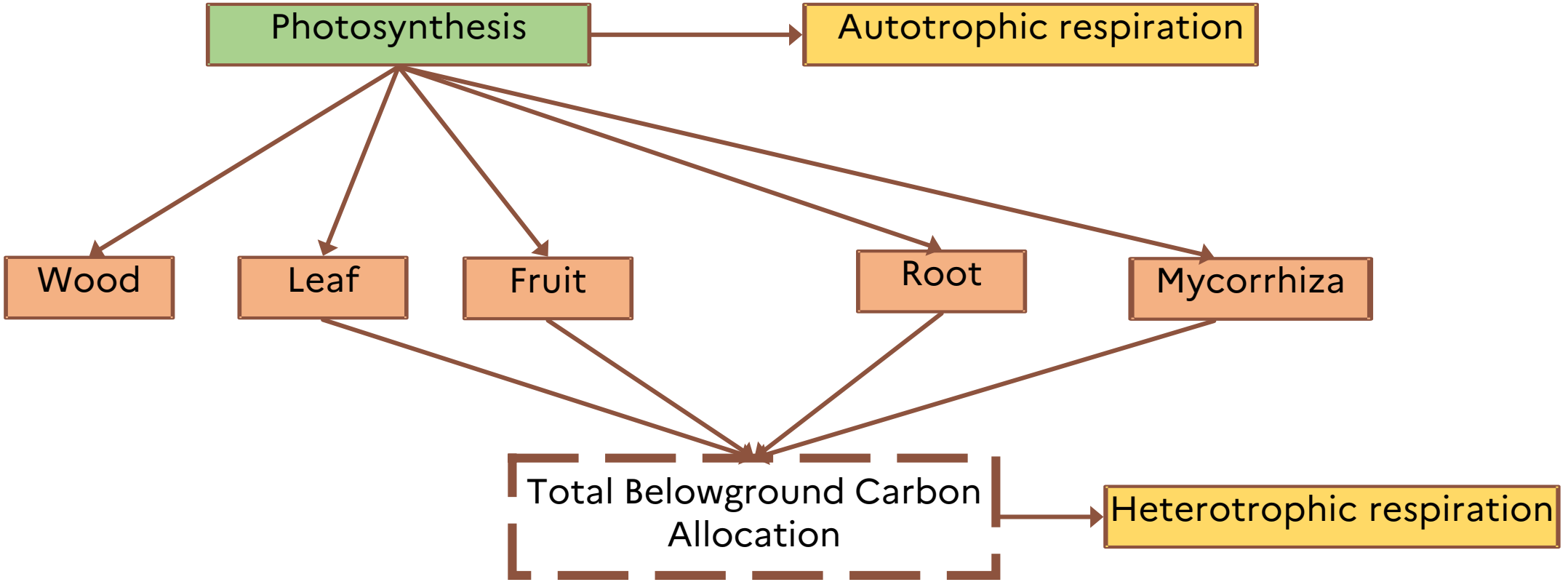
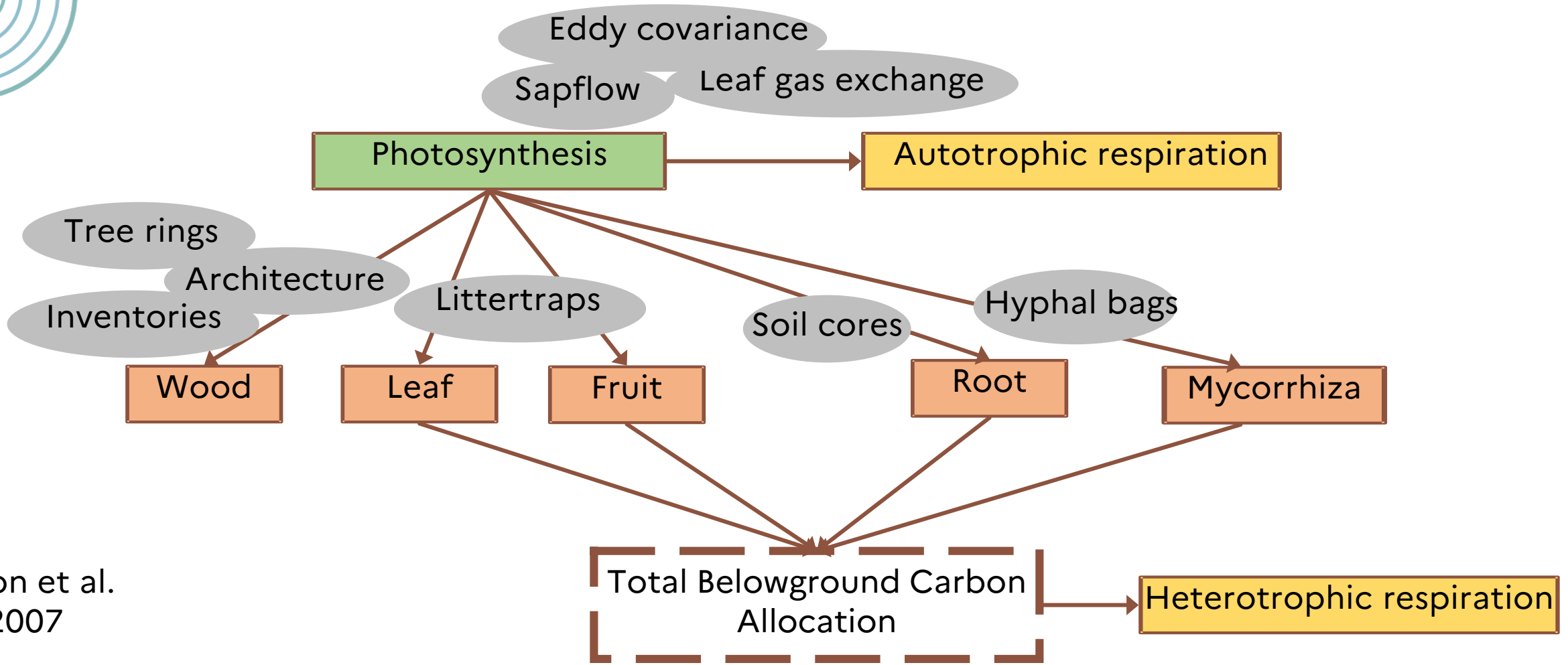
Principal tools mobilized



Litton et al. 2007

Principal tools mobilized



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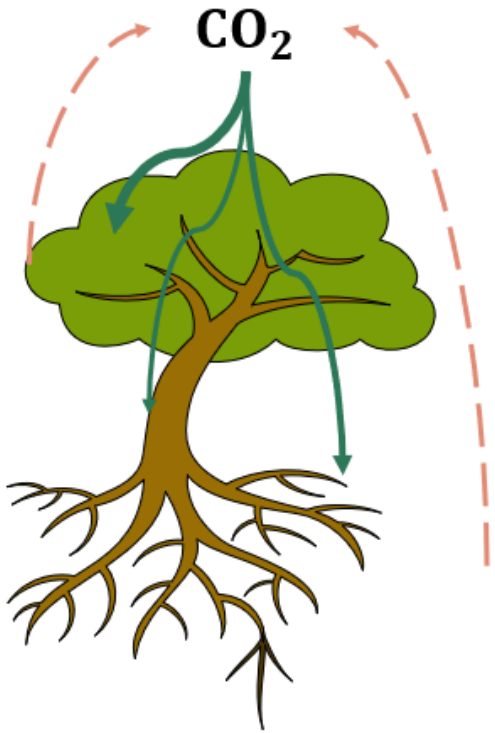
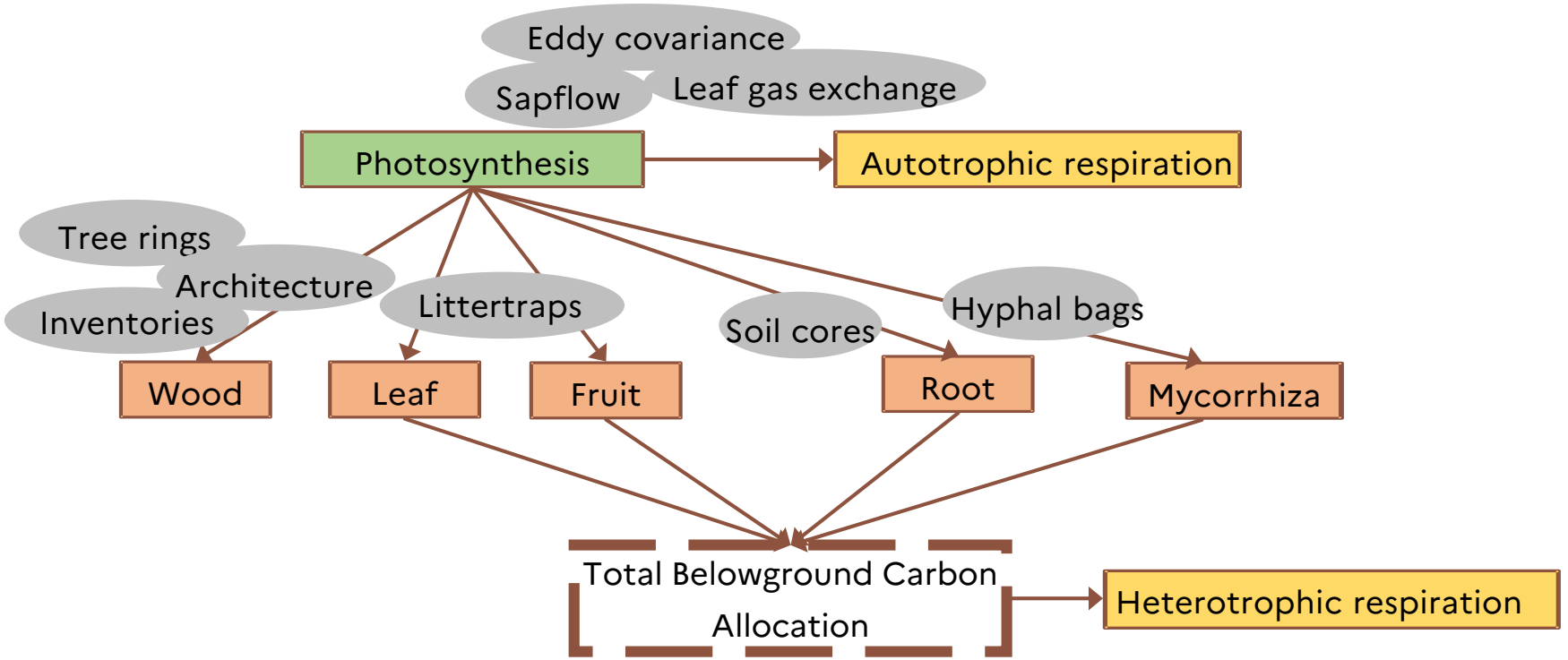
Thank you for your attention





Thank you for your attention

References:

- Cabon et al. (2022) Cross-biome synthesis of source versus sink limits to tree growth. Science doi:10.1126/science.abm4875
- Harris et al. (2021) Global maps of twenty-first century forest carbon fluxes. Nature Climate Change doi:/10.1038/s41558-02000976-6
- Litton et al.(2007) Carbon Allocation in Forest Ecosystems. Global Change Biology 13, n◦ 10: 2089-2109. doi:10.1111/j.1365-2486.2007.01420.x.

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